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REPORT OF THE CHIEF OF THE BUREAU OF HOME ECONOMICS

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF HOME ECONOMICS,
Washington, D. C., September 1, 1929.

SIR: I have the honor to present herewith the report of the Bureau of Home Economics for the fiscal year ended June 30, 1929.

LOUISE STANLEY, *Chief.*

Hon. ARTHUR M. HYDE,
Secretary of Agriculture.

This bureau has two quite different, yet overlapping, functions which must be considered in evaluating its work. The first function has been to study practical, everyday, home problems—problems that seem simple enough in themselves but are fundamentally important in the maintenance of the comforts and satisfaction of home living.

In the second place, the bureau is empowered to study the relative utility and economy of agricultural products for food, clothing, and other uses in the home, and to make special suggestion of plans and methods for the more effective utilization of such products in the home. In performing this function the bureau not only contributes toward better home making but makes a more direct contribution to agriculture. In this sense the bureau may be looked upon as a coordinating agency or a connecting link between the materials available on the one hand and a wise use in the home on the other.

This bureau is responsible for such material on home economics being carried out to the States by the various extension specialists and the two agencies in the Government interested in the teaching of home economics. It is looked to as a source of instruction material by State extension agencies, and those interested in the teaching of home economics. Through the various Federal and State agencies and the women's organizations with which it keeps in close touch, the bureau reaches a very large proportion of the 24,000,000 homes.

The bureau is looked to for leadership in the field of home economics research, which is rapidly being de-

veloped as the result of the Purnell Act permitting the use of experiment station funds for home economics research. Nearly all of the States are now using a portion of this fund for such studies. This throws additional responsibility upon the department, and there is need for supervision and coordination in this work. This is more necessary in home economics than in other fields because the problems are more similar from State to State, and the workers are newer in research. The work of the bureau with the States has saved, in the prevention of useless experimentation and better coordination of endeavor, sums of money many times that expended in this effort.

Development of research in a new field like home economics needs the development of new methods. New pieces of equipment have been tested. Information on methods and equipment has been made available to the States. Schedules of economic studies have been furnished with detailed directions for editing and summarizing the data as they are collected, and in some cases new workers have come into the laboratories of this bureau for definite instruction in details of method.

There are two agencies in the Government interested in the teaching of home economics—the Bureau of Education, and the Federal Board for Vocational Education. In the former there is a specialist in home economics education who is engaged in studies on organization and methods of teaching home economics. Associated with her in the Department of the Interior is a specialist in home economics who

has supervision of home economics in the Indian schools. This bureau has maintained cooperation with both these units, and a member of its staff has served on the committee for preparation of menus for use in the Indian schools. The home economics section of the Federal Board for Vocational Education has charge of the administration of the home economics portion of the fund made available to the States through the Hughes Act, and recently increased by the passage of the Mendel-Reed Act. Various publications of the two above groups are concerned primarily with methods, equipment, or organization of material for teaching. While there is no official connection between the Bureau of Home Economics and these agencies, the latter use the results of the bureau's research as source material, and in so far as possible we attempt to put the material in the form in which it will be the most useful to them.

Cooperative relations are maintained with other Government organizations. The work of this bureau relates very closely to certain aspects of that of the Children's Bureau and the Public Health Service. The line of separation is generally considered to be that the Bureau of Home Economics is responsible for problems having to do with the normal child. When the services of a pediatrician or social agency are required, the study may be a cooperative one or handled entirely by one of the other agencies. In the same way the problems of normal nutrition fall in the field of this bureau, leaving the therapeutic and pathological aspects of the subject to be handled only in cooperation with the Public Health Service. Similar cooperation will be needed in studies regarding the relation of clothing to health.

The bureau has been very fortunate during the past year and a half in having the opportunity to work with certain representatives of governmental organizations on the study of problems related to child care and training. The facilities of the Washington Child Research Center have been put at its disposal for studies in nutrition and clothing for children. Since various agencies are demanding material on child training for use in their extension activities, the close cooperation with the Child Research Center makes it possible for this to be provided as soon as a specialist can be made available.

The Bureau of Home Economics has gradually assembled a staff of 60

workers, of whom 30 are specialists in professional service, working now under three divisions: Economics, foods and nutrition, and textiles and clothing. The duties of these specialists are (1) to keep in touch with the scientific data available from Government and other research agencies which can be applied in their special field, (2) to interpret these and make their application to home problems, (3) to direct certain studies being conducted by other agencies so they will be of greater help in the solution of home problems, and (4) to initiate studies in parts of this field not being covered by any other agencies. In addition, members of the staff have the responsibility of keeping in touch with various welfare groups through which the accumulated information can be disseminated.

The first need was to work toward the establishment of fundamentally sound standards for food, clothing, and housing—the three important elements in the material side of home life, which would direct the wise use of our agricultural products in the home and at the same time help in the establishment of the basic facts for any educational program in home making.

National prosperity and lack of unemployment do not alone guarantee a higher standard of living to the people of any nation. Better wages must be directed into wise channels of expenditure if they are to be reflected in family and individual well-being. Standards are essential for the education of the consumer in the wise use of the goods available. The wider the opportunity for choice the greater the necessity for this education. Not only will such an educational program add to the physical well-being and mental satisfaction of the individual, but also, through the better adjustment of production and distribution which it would make possible, would contribute to the social and economic stability of the country as a whole.

The requirements for the material side of the home are considered first, not because of their greater relative importance, but because they can be measured more exactly and because they furnish the necessary foundation upon which the less tangible objectives of home life may be built. Time, money, and certain material perquisites should be spent to best advantage for family living. From the national point of view there must be wise direction of production and dis-

tribution of goods and services in order that "comfort and welfare" may be available to as many of these homes as possible.

ECONOMIC STUDIES

Economic studies must form the center of such a program, adjusting expenditure of time and material resources to the different needs of the family, balancing the various demands, and expressing them in terms of household budgets and time schedules. All this demands standards set up in objective terms showing the content of family living and how the time is spent against which detailed cost-of-living accounts, use of time studies, and results can be checked. To this end the economics division of the bureau has concerned itself chiefly with two sets of problems.

Cost-of-living studies have been made and the food and clothing figures analyzed to find the content of living. Figures collected by survey records will be compared with those obtained from actual household accounts to be used later as a basis for budget recommendations. Other Government agencies have been interested in cost-of-living studies, but no other Government agency has analyzed these expenditures and measured them against such standards as are now available to determine whether or not the money is being expended so as to promote the standard of living which should be maintained. Such standards need to be established in all lines of family expenditure. This can only be done by specialists who can analyze expenditures critically. Specialists in different lines of home making are available in this bureau. It is the hope that when in the future cost-of-living studies are undertaken by other Government agencies cooperative arrangements can be entered into so they can be analyzed by specialists and the content of living determined.

Time studies have been undertaken to determine the time spent in household tasks and to evaluate the economic return from time spent in various aspects of household production. These will form the basis for recommended time schedules and household-labor studies of different types.

COSTS AND STANDARDS OF LIVING

METHODS OF COLLECTING DATA ON FAMILY EXPENDITURES

The importance of studies of family expenditures has been intensified dur-

ing the last few years by the continued increase in the national income and the consequent changes in the demand made for various products by different groups of consumers.

Before new studies in this field are undertaken, either by this bureau or by other research agencies, information is urgently needed as to the accuracy used in collecting the data. The survey or schedule method, which is most often used, relies upon the housewife's memory of the expenditures made by her family during the preceding year. It has been recognized that such estimates probably involve more error than appears with the account method, where an actual record of expenditures is made daily by the housewife during the year. But the great difficulty of getting a large number of housewives to keep complete yearly accounts has discouraged the use of this method. No information has been available, however, as to the relative accuracy of the two methods or as to the items in the family budget which are most affected.

A study has therefore been made comparing the figures obtained by the schedule method with yearly accounts from the same families. The data were collected during 1926-1928, 44 farm families and 24 business and professional families sending in weekly records of expenditures for 52 consecutive weeks. At the end of the year a field agent visited each family and obtained schedule estimates of expenditures for the same period. Since the keeping of the accounts might improve the housewife's memory in giving the schedule figures, even though she herself did not summarize her accounts, control schedules were obtained from 22 of the farm families keeping accounts before the accounts were started, covering the preceding year, and from 41 additional farm families not keeping accounts, who were selected for purposes of comparison.

During the past year this material has been analyzed, and a report is now in preparation. This will include a detailed analysis of the figures on food consumption, comparing not only the quantities of the various foodstuffs consumed as shown by the two methods, but also the nutritive value derived from them.

OTHER STUDIES OF FAMILY EXPENDITURES

Reports are also in preparation on two other studies of family expendi-

tures started in 1927-28. One study covers 190 business and professional families from various parts of the United States—a type of family almost entirely neglected in previous standard-of-living studies. The results as to the cost of children and the cost of medical care in these middle-class homes are of special interest. From 66 of these families yearly accounts were obtained from weekly reports sent in to the bureau, and from the remainder yearly schedules were obtained by a field agent.

The other study deals with families receiving mothers' pensions. Through the Bureau of Public Welfare of the District of Columbia, Division of Mothers' Pensions, complete yearly accounts were secured from 45 families. The analysis of these data throws valuable light on the adequacy of the living available to these mothers and their children, and on the wisdom with which the pension is expended.

CLOTHING EXPENDITURES OF FARM FAMILIES

The report of the study of clothing expenditures of 2,459 farm families in 10 States is awaiting final tabulation. The data used in this study were obtained by the schedule method, as part of the larger study of the farmer's standard of living made in cooperation with the Bureau of Agricultural Economics.

TRENDS IN COTTON CONSUMPTION

It has been evident during the past few years that consumers are shifting from cotton to silk or rayon for certain articles of clothing and of household furnishings. The extent of these changes, however, or the types of articles most affected, has not been known. A survey was therefore started in the summer of 1927 to obtain information on these points. Through the cooperation of teachers in colleges and universities, extension workers, and club women, over 1,000 questionnaires were filled in by men and women representing all sections of the country. This material has been analyzed and a report printed in one of the regular series of the department.

HOUSEHOLD PRODUCTION

TIME STUDIES

The study of the use of time by home makers is also being brought to a close.

During the past year the figures from weekly time records of 1,100 home makers in 36 States have been tabulated, and two preliminary reports have been prepared. Special reports are now being written on the help received by home makers from various members of the family and from paid workers, on the equipment used in these homes and its effect upon the time spent on various tasks, and on the use of leisure by farm women. The complete report of this study will appear during the coming year and comparisons will be made with the time records from about 1,000 additional home makers obtained by research workers in Oregon, Washington, Rhode Island, and South Dakota who are cooperating in the study under Purnell funds.

WHO DOES THE LAUNDRY?

As a part of the study of the changing uses of textile fibers, information was obtained from 822 housewives and 168 self-supporting women as to how their laundering was being done—whether by themselves or another member of the family, by a paid laundress, or by a public laundry. A report of this inquiry, showing the practice in farm homes and in city homes with varying incomes, appeared in October, and a more detailed report is now in manuscript.

EMPLOYER-EMPLOYEE RELATIONSHIPS IN THE HOME

In over a million homes of the country, paid workers are employed to assist in the work of the household. The maladjustment existing in this important industry is so general and so acute that it is known to every man, woman, and child as "the servant problem." In October of the past year the bureau cooperated with the Women's Bureau of the Department of Labor and the industrial department of the Young Women's Christian Association in calling a 2-day conference to discuss this problem, from the standpoints of the employer, the employee, and the public. As a result of this conference, a permanent national committee on employer-employee relationships in the home was established, with two members of the bureau, a member of the Women's Bureau, a member of the Federal Board for Vocational Education, and representatives of various interested groups on the executive committee. The

functions of the committee were stated as follows:

To learn what is now being done and has been done in this field, and to evaluate the experience thus gathered, considering such problems as standards of employment, education, placement and follow-up legislation, and organization.

To formulate a program of research and experimentation.

To seek the cooperation of agencies working in this field in carrying out this program.

To consider the desirability and possibility of securing funds for conducting this work and for carrying on additional study and experimentation.

During recent months the committee has proceeded with the formulation of a research program and with a survey of the existing activities in this field. In this work, and especially in the research program, the bureau has assisted.

FOODS AND NUTRITION

Food is one of the first considerations in any standard of living. The economic value of the agencies concerned in food production, manufacture, and distribution, as well as the close relation of food to health and physical well-being, emphasizes the importance of a more staple food production and distribution program based on nutritional requirements. Flexible food standards, capable of being adjusted to our increasing knowledge of nutrition, have been established.

The Foods and Nutrition Division of the bureau has been largely concerned with the development of the necessary information to establish these standards in practice. This has involved (1) collection and publication of data on food composition; (2) research in the vitamin content of foods and compilation of results and literature references on the occurrence of vitamins in all food materials so far studied, together with bibliographical references on technic; (3) dietary studies among families and institutions and the development of methodology for making such studies; and (4) food-utilization studies.

PROXIMATE COMPOSITION OF FOODS

Research on the chemical composition of fresh vegetables has followed the work on fresh fruits and fruit juices published last year. From the standpoint of dietary calculations, there was more urgent need for figures on vegetables, probably, than for any other class of foods. Since the last compilation on proximate composition of foods by W. O. Atwater was issued

by the department in 1906, no new data on this important class of foods have been assembled in an available form, and analyses had not then been made of many vegetables on our markets to-day. A few new analyses have been made at the instigation of this bureau, and many other data, published and unpublished, have been collected and studied for the purpose of providing tables that will furnish reliable information on about 95 vegetables. These tables are now nearing completion and are being reviewed by various horticulturists and marketing specialists.

VITAMIN CONTENT OF FOODS

The examination of foods to determine their vitamin content has been continued in the nutrition laboratories in conjunction with studies designed to improve the technic used in these assays.

Recent work on vitamin B in the laboratories of this country, as well as elsewhere, has clearly shown that it must be regarded as comprising two separate factors having distinctly different physical and chemical properties. One factor has heat-labile and antineuritic properties and the other has heat-stable and pellagra-preventive properties. The recognition of the "dual nature of vitamin B" has made it necessary to devise methods for detecting the presence of these two factors in foods. Tentative methods have been described by workers in other laboratories, and the more promising of these have been tried in the laboratory of this bureau. Results obtained during the course of this study showed that rice polishings are a good source of the antineuritic vitamin and contain but a small amount of the pellagra-preventive vitamin. Wheat germ and yeast are excellent sources of both factors, whereas white corn contains an abundance of the former and a very small amount of the latter.

The determination of the vitamin content of watermelon is in progress.

Recently several distributors of Japan green tea have described their product as a valuable source of vitamin C. Inasmuch as vitamin C is easily destroyed, especially when foods are dried, their claims seemed unlikely. For this reason the infusions made from four samples of tea have been assayed, with the result that no appreciable amount of vitamin C could be detected in any of the samples.

The practice of sending rats to those requesting them for use in dem-

onstration work has been continued. A greater number of animals was sent to teachers and demonstration agents than last year, and it was not possible to comply with all the requests.

The series of nine charts containing photographs of rats or guinea pigs that had been fed a diet deficient in one or another of the well-known food constituents are now in press, and will be available by purchase, at a nominal sum, from the Superintendent of Documents, Government Printing Office.

Through a cooperative arrangement with the Office of Experiment Stations, a comprehensive summary of data on vitamins in foods has been made and is now in press. In addition to occurrence tables for vitamins A, B, and C, there are included some 400 literature references on the occurrence of these and the other vitamins so far differentiated and on technic in vitamin research. The illustrations for this bulletin are of rats and guinea pigs from the laboratories of this bureau. They exhibit symptoms typical of vitamin deficiency and show normal nutrition resulting from adequate diet. These vitamin tables used in conjunction with the figures on proximate composition will give more complete information on the food value of a great variety of foods common in the American dietary than has been available heretofore from Government sources.

DIETARY STUDIES

Dietary studies have been made to determine variations in existing food habits from the requirements usually recognized as essential for good nutrition. This work has been carried on in close cooperation with the cost-of-living studies, since in food there have been set up definite standards against which the content of living can be measured. During the past year a technical bulletin describing a new short-cut method of calculating the various nutrients in the diet has been published. By this method a time saving of 40 per cent in making dietary calculations can be effected, a matter not only of great importance to the work being done in this bureau but in States conducting similar studies under Purnell funds.

The data on the food consumption of farm families have been further analyzed and are now being prepared for publication. In connection with this and some studies being made on the food habits of professional and business families, data have been assembled comparing the schedule with the

survey method of collecting information on food habits, this being a part of the study mentioned under cost of living. The material on food is being given intensive study.

The data on the quantity and cost of food served to college students, which have been collected in cooperation with agencies in several States, are now in press. A study of food consumption in children's institutions is nearing completion. Data collected by the Merrill-Palmer School, Detroit, Mich., on dietary habits in Grosse Ile, a very restricted community near Detroit, have been made available to this bureau for analysis.

At the request of the home demonstration manager and the home demonstration agent in a county in South Carolina, the bureau entered into cooperative arrangements for the study of the dietary habits of the families affected with pellagra. Studies were made both before and after the season during which pellagra becomes most active. With a limited number of families protective foods were introduced in order to determine the effect of these on the incidence of pellagra. This work has been done in close cooperation with the local health authorities and is now being summarized.

FOOD UTILIZATION

Food-utilization studies have been made to test the quality of food produced under varying conditions, to determine more satisfactory uses for well-known foods, and to find uses for new foods brought to our attention by producing groups. Special attention has been given to the possible utilization of materials now regarded as by-products. These studies are important from the economic point of view in promoting the wise utilization of agricultural products and in making possible the proper feeding of groups at different income levels.

PALATABILITY OF MEAT

The most detailed experiment which the bureau has undertaken in food utilization has been the project in cooperation with the Bureau of Animal Industry and some 20 State agricultural experiment stations on the palatability of meat. During the past year there have been cooked in our laboratory, according to the standard methods, and tested for palatability 142 rib roasts of beef, 557 legs of lamb, 20 whole fresh hams, 47 half fresh hams, and 38 pork loins. These have been sent in from 16 States.

A limited amount of experimental work has been done toward determining what comparative effects are produced on meat by increasing the roasting temperature above that specified in the standard directions for cooking meat for palatability tests. The practical reason for this study is to find out whether or not the long, slow cooking of the standard methods has the effect of obscuring in a series of meat samples differences that would have been noticeable if the same samples had been cooked according to the household directions given in popular leaflets issued in connection with the work of the project. Pairs of cuts were used in these experiments. One member of the pair was cooked according to the standard directions, and the other according to household directions. The samples were all judged by the palatability committee. Data have been assembled for 16 pairs of legs of lamb and 30 pairs of beef rib roasts, but have not been completely analyzed.

Work was continued on the roasting of chicken for the purpose of setting up a standard method of cooking chicken for palatability tests. Thermo-couples and mercury thermometers were used to determine meat temperatures. No satisfactory way has been found so far for determining the end point of cooking chickens in palatability tests. Some progress has been made, however, on this complicated problem.

Cooking experiments were carried on to furnish the basis of household recipes published in the revised beef leaflet, in the leaflet on eggs, and in the fresh pork leaflet.

UTILIZATION OF NEW FOODS AND BY-PRODUCTS

In cooperation with the Bureau of Biological Survey, studies have been made of methods of preparing reindeer and domestic rabbit meat. These data are to be published in leaflet form.

Comparison of the cooking quality of rice of different varieties and from different sources has been made with a view particularly to finding a native variety that will prove satisfactory under the conditions of processing required in making soup in commercial quantities. Considerable further study on this problem is needed.

In the study of the use of by-products, special attention has been paid during the past year to rice polishings and wheat germ. Rice polishings is a rich source of vitamin F and wheat

germ is, after yeast, one of the most valuable sources we have of vitamins F and G. Rice polishings and wheat germ are generally sold as by-products from the mills, partly because they spoil rather readily if untreated and therefore can not well be left on the rice or in the flour without causing its deterioration. The bureau has shown that these may be preserved by a short heating process, followed by sealing, and has worked out palatable recipes for their use. It is believed that they both furnish valuable and cheap additions of minerals and at least one of the vitamins for diets likely to be restricted in these important factors, and that a solution of the whole-wheat bread controversy may be found by preserving the wheat germ separately and adding it to the white flour at the time of bread making.

Inasmuch as palatability is an important factor in determining the amount of food consumed, recipes are tested and new ones worked out for home and institutional use in order to develop a higher standard of food preparation. It would be difficult to estimate the waste each year due to unpalatable food preparation, loss of nutritive constituents, and waste of time through unnecessarily complicated methods of preparation. Only by scientific study will any standards for food preparation be established. Seventy-eight tested recipes have been contributed to the radio releases issued by the department.

TEXTILES AND CLOTHING

In the division of textiles and clothing studies are being developed from the same points of view. The direction of choice, use, and care of clothing and the setting up of clothing standards were the first points of attack. It is necessary in the matter of clothing, as in the matter of foods, for educational agencies to work closely with the industries, presenting to them the viewpoint of the consumer and working with them in the development of types of materials and garments which are more directly suited to the needs of the consumer. The small amount of work we have been able to do indicates that the producer is interested in having this help and is quite willing to give adequate co-operation and to do all in his power to develop his material to this end.

During the past few years producers and manufacturers of this country have made use of style in an unfortunate way to increase sales. In most

cases emphasis has been laid on change rather than on real value. These rapidly changing styles have resulted in enormous economic waste, and an increasing number of both producers and consumers want more fundamental standards established. The work of the bureau on textile materials and clothing has therefore been concerned largely with investigations undertaken in an effort to help bring about a more economical and satisfactory selection and utilization of textile goods, especially those of importance in the agricultural program of the country. In addition, cooperation has been given to national organizations that are attempting to set up quality specifications on such materials as sheeting, blankets, and silk goods in order to give the consumer information upon which to base an intelligent selection.

CHILDREN'S CLOTHING

The utilization of cotton and wool in children's clothing has been given particular attention. In this work modern developments in child health and child training have been taken into consideration and special emphasis laid upon the desirability of hygienic clothing.

Suits for small boys have been designed that are in accord with present theories on child training and are more practical than the suits now on the market from the standpoint of ease of cleaning and of manipulation by the child. A leaflet describing these is in press.

A hot-weather dress for the little girl has been devised which eliminates the necessity of an underwaist and provides a comfortable 2-piece garment for summer wear. In cooperation with the Washington Child Research Center, a self-help bib was developed which can be put on and taken off by pre-school children.

Protective suits to be worn by children in cold and rainy weather have also been devised in cooperation with nursery-school specialists, and descriptions and illustrations will be issued in leaflet form. These are garments that will protect the child so that outdoor play will be possible even in inclement weather. They are also so designed that the child can put them on and take them off without adult assistance. In cooperation with the Cotton-Textile Institute and the Wool Institute, commercial fabrics have been studied in an effort to ascertain which are most suitable for these suits. Such properties as heat insulation, air permeability,

tensile strength, and weight are being determined, and it is hoped that as a result specifications can be set up for lightweight materials of suitable construction.

WEARING QUALITIES OF COTTON FABRICS

The reaction to wear of 500 sheets of known history, discarded by a Washington hotel, was determined and reported on. The study showed that a sheet tends to wear out where the shoulders of the person occupying the bed rub against it. In almost every worn place, whether threadbare or torn, the filling yarn had given away before the warp yarn. Many of the sheets showed wear down the center lengthwise fold. These results are indicative of improvements that might be made in the construction of sheets in order to increase their wearing properties. This study is being followed by an investigation of the durability of sheeting made of cotton of known grade and character. The material is being woven in cooperation with the Bureau of Agricultural Economics and the sheets will be used and laundered in a Washington hotel.

LAUNDERING AND SIZING OF FABRICS

The studies on laundering and sizing of cotton fabrics have been continued. A technical bulletin has been published reporting the part of the work dealing with a method for measuring the stiffness of sized fabrics and the stiffness produced in fabrics by different starches and starch mixtures. This study has been extended to include more uncommon starches, such as dasheen and canna, and the relation of penetrability of the starch to the stiffness of the fabric is being given particular attention.

Methods developed in our laboratories for artificially soiling materials to be used in experimental studies and for determining the soil removed by various laundry processes is described in a paper now awaiting publication in a research journal. The influence of ironing on cotton fabrics of different construction and containing cotton of various grades and character is being investigated in connection with a project in which the Bureaus of Agricultural Economics and Home Economics are cooperating. An experimental household ironer has been developed in cooperation with a manufacturer and will be used not only to learn the effect of different temperatures and pressures employed in ironing upon cotton

fabrics, but also to determine the best temperatures and pressures for different types of materials. Color changes and the effect on the gloss and tensile strength of the fabrics are some of the points being studied. This investigation has also involved a consideration of the chemical changes that take place in cotton when heated under pressure, and preliminary studies have been made in this field.

HYGIENIC ASPECTS

In order to bring available information within the reach of investigators working on the hygienic aspects of clothing, a bibliography of 1,180 references to scientific and popular literature published in English, French, and German has been compiled and transmitted for publication.

A preliminary study has been made of the effect of different fabrics on the skin temperature of individuals. This will be followed, it is hoped, by other investigations on the physiological effect of clothing that can be used as a basis for recommendations for the selection of hygienic garments to be worn under different climatic conditions.

OTHER STUDIES NEEDED

HOUSING AND EQUIPMENT

A division for study of housing and equipment has not been formed, but problems of kitchen planning, planning the house for convenience, and home refrigeration have been studied.

Housing standards and methods of meeting them need further study. The home economist has cooperated with Better Homes in America in an educational program. Research is needed, however, to develop and study the problems in both housing and equipment which arise in connection with the educational work of these organizations. New building materials are being developed. These should be tried out and tested. This should be undertaken in cooperation with other Government and welfare agencies, but planned so as to add to their programs those factors which can come only from those who see the problem from the point of view of carrying out the work of the home. Houses are being planned without due thought as to whether they will make possible efficient housekeeping. While housekeeping is not an end in itself, it is an essential background for good home making.

Housing is important not only from the point of view of cost and efficiency, but also from the point of view of health and the aesthetic development of the individual. Housing studies can not be separated from the study of equipment, the kinds available, the cost of the equipment in the individual home, the cost of using equipment cooperatively as compared with the cost of having work done outside by either commercial or cooperative agencies.

There is need for studying multiple housing, both the grouping of the individual homes around some centralized agencies for taking care of certain necessary parts of housekeeping and apartments which can combine some of the advantages of the separated home with those of a multiple dwelling. Among such advantages might be mentioned centralized heating, centralized service for cleaning, some centralized food preparation, even extending so far as the central dining room for those who care for service of this type.

The home maker must bring all of these material aspects together, applying the results of economic studies and balancing them against each other so as to form the physical background of the home. At the same time she must see that the housekeeping does not become an end in itself but serves only as a means for the development of the higher values of home life. The home maker directs not only the expenditure of money but the expenditure of time in the home. In cooperation with the other members of the family, she must plan and direct the recreation of the whole group and the training of the children in the home. The wise use of the material aspect of housekeeping may be directed so as to influence the training of the children in the home and the setting up of a home environment which will make for maximum development of all.

HOME RELATIONSHIPS

Some homes succeed, some do not. No two people would agree upon the details which make for perfect relationships in family life, and no one description would cover them. Unquestionably these relationships will take different forms, depending upon the individuals concerned, and family life must be a reflection of their developing personalities. There is a growing insistence, however, that studies be made to find out some of the elements which enter into success-

ful family life. No home to-day can withstand changes brought about by the onward march of our social and industrial life unless it adjusts to them. The home must be studied in the light of these changes, and particularly to see how it can be organized so as to meet the demand for self-expression and freedom without the sacrifice of present values. The home has at its command to-day resources which, if wisely used, promise to enrich life, to give fuller expression to individual personality and a better rounded development for all the members of the family than ever before.

CHILD DEVELOPMENT

The United States is pledged to the policy of giving to every child a chance to develop to the fullest his potential capacities. Such provision can be secured only by the cooperative effort of home makers and the agencies interested in bettering conditions for child life. Experts from many fields, pediatricians, nutritionists, psychologists, and a large group of social and educational agencies are making contributions to our knowledge of the proper care of the young child, but their investigation and teaching have little effect upon actual conditions surrounding our young children until the home and the parents in the home understand and apply them.

RECREATION

The home must direct the use of leisure time. Industrial efficiency is bringing to a large group increased leisure. Application of the same principles of efficiency to agriculture and home making should make possible increasing leisure for still larger numbers. It is essential that some plan be worked out by means of which home makers may direct the use of leisure time into wholesome recreational activities which will add to the development of the individual. Unless this is done, increased leisure is going to prove a menace to our civilization.

INSTITUTIONAL HOUSEKEEPING

Home economics is ordinarily looked upon as being concerned only with home making. It also has a contribution to make to institutional life and Government housekeeping. No beginning has been made as yet in applying there some of the standards we are

commencing to apply in private homes, even on the material side. The application of principles of efficient management to institutions should make possible a higher standard of care at lower cost. Moreover, our institutions, whether they are eleemosynary or punitive, should not be looked upon as providing just physical care, but should be so organized that they will turn back the individuals into the community better prepared mentally and spiritually, as well as physically, to carry on. The institutions might well be used as a means of obtaining data on some of the facts which must be brought together and also as training schools for home making as applied to larger units.

LIBRARY

The work of the Bureau of Home Economics library has continued to increase. The aim of the library is to make the literature on home economics and related subjects easily accessible to the bureau staff and to visiting home economics workers. This is done by indexing the current information for the card catalogue, by acquiring new books and periodicals at the request of the staff, and by borrowing the desired books and periodicals from the Library of Congress or other libraries. This year 3,251 cards were added to the general catalogue. A special textile and clothing index of 10,000 cards is being revised.

The library has prepared a number of lists of references on specific subjects in connection with the general correspondence of the bureau and at the request of other libraries or visiting scientists. Among those from outside of the department who made use of the library during the past year were scientific workers from Arkansas, Minnesota, Nevada, Missouri, Virginia, and Maryland, some of whom remained for several weeks. As the number of workers in the bureau increased so did the number of loans from the library. At the request of the staff 55 new periodicals were added to those already received, and the total circulation of periodicals increased by 1,736.

PUBLICATIONS, INFORMATION, AND EXHIBIT SERVICE

Bulletins in the regular series of the department, articles in technical and popular periodicals, news and radio releases have continued as in previous

years to be the chief means of disseminating the results of research conducted by the bureau.

The following seven contributions from this bureau have been printed by the department during the past fiscal year, and six others have been transmitted for publication:

- Short method of calculating energy, protein, calcium, phosphorus, and iron in the diet. Technical Bulletin 105.
- Stiffness in fabrics produced by different starches and starch mixtures, and a quantitative method for evaluating stiffness. Technical Bulletin 108.
- Proximate composition of fresh fruits. Circular 50.
- Vitamins in food materials. Circular 84. (In press.)
- The changing uses of textile fibers in clothing and household articles. Miscellaneous Publication 31.
- Cooking beef according to the cut. (Revised.) Leaflet 17.
- Eggs at any meal. Leaflet 39.
- Good food habits for children. Leaflet 42.
- Pork in preferred ways. Leaflet 45. (In press.)
- Reindeer recipes. Leaflet 48. (In press.)
- Ice creams frozen without stirring. Leaflet 49. (In press.)
- Suits for the small boy. Leaflet 52. (In press.)
- Nutrition charts. Series of nine, 16 by 20 inches in size, depicting results of feeding experiments on white rats and guinea pigs. (In press.)

In addition to these publications belonging to the regular series of the department, there were contributed to the Yearbook of Agriculture, 1928, of the department eight articles covering as many different phases of the eco-

nomic, textile, clothing, and food and nutrition research. Scientific and popular articles to the number of 250 were contributed to professional journals, magazines, and newspapers, and a mass of source material on the various phases of the work of the bureau was assembled in response to the request of special writers.

As during the two previous years, the menus and recipes for the Housekeepers' Chats have been furnished to the radio service, this year a total of 140 menus and 78 new recipes. Topics and material for the chats have been furnished regularly as a part of the cooperative arrangement, and various members of the staff have given talks as a part of the noon-hour programs broadcast over an extensive network.

A series of 60 lantern slides with accompanying lecture notes entitled "Come Into the Kitchen" was prepared for distribution through the Office of Cooperative Extension Work.

A 24-slide balopticon in colors entitled "Cooking Lamb from Tip to Tail" was arranged from photographs of meats prepared in our laboratories as part of the department exhibit at the 1928 International Livestock Show in Chicago.

Our general correspondence has increased 50 per cent, and during the year we have accordingly answered 15,000 letters asking for information or publications on a wide range of home-economics topics.

